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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,192	04/22/2004	Toshio Inoue	112272.01	6053

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EXAMINER	
TRAN, BINH Q	

ART UNIT	PAPER NUMBER
3748	

DATE MAILED: 04/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,192	INOUE ET AL.	
	Examiner	Art Unit	
	BINH Q. TRAN	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/133,410.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the amendment filed January 30, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-3, 6-13, and 16-21 are rejected under 35 U.S.C. 102 (b) as being anticipated by Yamamoto et al. (Yamamoto) (Patent Number 6,293,095).

Regarding claims 1, 11, and 21, Yamamoto discloses a method and apparatus of controlling an internal combustion engine (1) of a vehicle in which an exhaust purifying catalyst

(6) is provided in an exhaust system of the internal combustion engine, the method comprising the steps of controlling burning of fuel to operate the internal combustion engine; and injecting fuel into the internal combustion engine during a moving state of the engine, without causing the fuel to be burned, before a normal operation of the engine by fuel being burned (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claims 2, 12, and 20, Yamamoto further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state, without causing the fuel to be burned, when a predetermined condition is satisfied while the vehicle is running (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claims 3, and 13, Yamamoto further discloses the step of stopping burning of the fuel by cutting a fuel supply to the internal combustion engine (e.g. See Figs. 1-18; col. 16, lines 1-67).

Regarding claims 6, and 16, Yamamoto further discloses the step of not injecting fuel into the internal combustion engine that shifts to the moving state based on a temperature of the exhaust purifying catalyst (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claims 7, and 17, Yamamoto further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state and not igniting the fuel (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claims 8, and 18-19, Yamamoto further discloses the step of driving the internal combustion engine by the burning of the fuel when the speed of the internal combustion

engine has become equal to, or greater than, a predetermined speed (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claim 9, Yamamoto further discloses the step of not injecting fuel into the internal combustion engine that shifts to the moving state when the speed of the internal combustion engine is equal to, or greater than, a predetermined speed (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Regarding claim 10, Yamamoto further discloses the step of injecting fuel includes injecting fuel for a predetermined amount of time into the internal combustion engine that shifts to the moving state (e.g. See Figs. 1-18; col. 7, lines 45-67; col. 8, lines 1-59; col. 16, lines 1-67).

Claims 1-21 are rejected under 35 U.S.C. 102 (e) as being anticipated by Sugiura et al. (Sugiura) (Patent Number 6,220,019).

Regarding claims 1, 11, and 21, Sugiura discloses a method and apparatus of controlling an internal combustion engine (1) of a vehicle in which an exhaust purifying catalyst (116) is provided in an exhaust system of the internal combustion engine, the method comprising the steps of controlling burning of fuel to operate the internal combustion engine; and injecting fuel into the internal combustion engine during a moving state of the engine, without causing the fuel to be burned, before a normal operation of the engine by fuel being burned (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 2, 12, and 20, Sugiura further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state, without

causing the fuel to be burned, when a predetermined condition is satisfied while the vehicle is running (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 3, and 13, Sugiura further discloses the step of stopping burning of the fuel by cutting a fuel supply to the internal combustion engine (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 4, and 14, Sugiura further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state, without causing the fuel to be burned, when the vehicle starts to be driven by a motor after being driven by the internal combustion engine (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 5, and 15, Sugiura further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state, without causing the fuel to be burned, before the vehicle starts to be driven by the internal combustion engine and after being driven by a motor(e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 6, and 16, Sugiura further discloses the step of not injecting fuel into the internal combustion engine that shifts to the moving state based on a temperature of the exhaust purifying catalyst (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 7, and 17, Sugiura further discloses the step of injecting fuel includes injecting fuel into the internal combustion engine that shifts to the moving state and not igniting the fuel (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claims 8, and 18-19, Sugiura further discloses the step of driving the internal combustion engine by the burning of the fuel when the speed of the internal combustion engine

has become equal to, or greater than, a predetermined speed (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claim 9, Sugiura further discloses the step of not injecting fuel into the internal combustion engine that shifts to the moving state when the speed of the internal combustion engine is equal to, or greater than, a predetermined speed (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Regarding claim 10, Sugiura further discloses the step of injecting fuel includes injecting fuel for a predetermined amount of time into the internal combustion engine that shifts to the moving state (e.g. See Fig. 4-6; col. 6, lines 59-67; col. 7, lines 1-63; Claim 1).

Response to Arguments

Applicant's arguments filed January 30, 2006 have been fully considered but they are not completely persuasive. ***Claims 1-21 are pending.***

Applicants have argued that any one of Yamamoto and Sugiura do not teach or suggest Applicants's claimed invention. More specifically, Applicants assert that the reference to both Yamamoto and Sugiura fail to disclose "*the step of injecting fuel into the internal combustion engine during a moving state of the engine, without causing the fuel to be burned*". The examiner respectfully disagrees, in column 16, lines 18-67, Yamamoto has clearly disclosed that "Then, exhaust gases subsequently discharged from the same cylinder and those from other cylinders that meet at the joining portion 10b flow continuously into the exhaust chamber 10A, and the ***unburned HC remaining in the exhaust chamber 10A is mixed with these exhaust gases***. In some of the exhaust gases, part of the additional fuel injected during the expansion stroke is still burning without

being extinguished, and ***the unburned HC remaining in the exhaust chamber 10*** is mixed with the exhaust gas that is still burning, and starts re-burning. If ***additional unburned HC*** *flows into the exhaust chamber 10, already in the burning condition due to re-combustion of the existing HC, the newly introduced HC also starts re-burning. Thus, unburned HC flowing into the exhaust chamber 10A burns due to a chain reaction created in the chamber 10A, thus keeping the inside of the exhaust chamber 10 in the burning condition all the time*. The temperature of the exhaust gas is increased to an even higher level due to ***the combustion of the unburned HC***. The exhaust gas, whose temperature has been increased by the expansion stroke injection, is discharged from the combustion chamber, into the exhaust manifold 10 in which its temperature is further increased due to re-combustion of unburned HC, and then supplied to the catalysts 6A, 6B of the exhaust purifying device 6 to increase the temperature at the center of the catalysts 6A, 6B. When the temperature (catalyst temperature) Tc in the exhaust purifying device 6, detected by the catalyst temperature sensor 15, exceeds the predetermined temperature Tc0, the additional fuel injection control unit 27 judges that the catalysts 6A, 6B are in the activated states, and stops the expansion-stroke injection ". It is well understood that additional fuel is injected during the expansion or exhaust stroke cause the fuel burned in the exhaust gas system.

In addition, Sugiura, in column 6, lines 59-67; and column 7, lines 1-63, has clearly disclosed " In step S11, an engine stop judging process is executed to judge whether the operation conditions in which the engine 1 is to be stopped are produced or not, or whether conditions of stopping the engine 1 are satisfied or not. If it is judged that the operation conditions in which the engine 1 is to be stopped are produced, a stop judgment flag FESTP is set to "1". ... f it is judged in step S12 that FESTP=1 or the conditions of stopping the engine 1 are satisfied, it is judged

whether a stored value KCMDB of the target equivalence ratio is smaller than "1.0" or not, or whether the lean operation is being performed or not (step S13). As shown in FIG. 5 which will be described later, the stored value KCMDB is a stored value of the latest target equivalence ratio KCMD, and, *during execution of reduction enrichment, is a stored value of the target equivalence ratio KCMD which is obtained immediately before start of the reduction enrichment.* In other words, when the stored value KCMDB is referred, it is possible to judge whether the lean operation in which the air-fuel ratio is set to be on a lean side with respect to the theoretical air-fuel ratio is currently performed or ***the stoichiometric/rich operation in which the air-fuel ratio is set to the theoretical air-fuel ratio or to be on a rich side with respect to the theoretical air-fuel ratio is currently performed. If it is judged in step S13 that KCMDB.gtoreq.1.0 or the stoichiometric/rich operation is being performed, the engine 1 is immediately stopped (step S18), and the stop flag FESTPA is set to "1" (step S19).*** Thereafter, this process is ended. Specifically, the engine 1 is stopped by interrupting the fuel supply to the engine 1 and the supply of the driving signal to the ignition plugs 111. If it is judged in step S13 that KCMDB<1.0 or the lean operation is being performed, it is judged in step S14 whether an enrichment time TRICH has elapsed after the timing when the stop flag FESTPA is set to "1" or not. At the initial time, this judgment results in negative (NO), and hence an enrichment flag FRICH is set to "1" (step S15) and the control advances to step S17. *If the enrichment time TRICH has then elapsed, the control advances to step S18 to stop the engine 1.* ***The enrichment time TRICH is set to a time period (for example, about 1 or 2 seconds) when, under a state where the NOx absorbent of the NOx purifying apparatus 116 absorbs NOx to its limit, the whole amount of the absorbed NOx can be reduced***. As described above, in the embodiment, when the engine 1 is to be stopped during the lean operation, reduction enrichment is

executed during the enrichment time TRICH, and the engine 1 is then stopped. Therefore, the sufficient NOx absorbing ability of the NOx purifying apparatus 116 can be maintained. Further, even immediately after the engine 1 is restarted, it is possible to surely prevent NOx from being released". Sugiura has clearly showed the step of injecting fuel into the internal combustion engine during a moving state of the engine, without causing the fuel to be burned, before a normal operation of the engine by fuel being burned so as to reduce the NOx in the exhaust gas of the engine.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BT
April 14, 2006

Binh Q. Tran
Patent Examiner
Art Unit 3748